Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A method for quantitatively evaluating a graphite structure of a gray cast iron by an image analysis apparatus, ~~characterized by~~ comprising the steps of

analyzing a magnified image of the graphite structure~~, thereby extracting~~ to extract non-spherical graphite pieces ~~of a particular size class~~ having sizes within a first range, contained in the graphite structure to calculate ~~the~~ a number ~~and areas~~ of the extracted non-spherical graphite pieces;

calculating a thick and thin degree expressing a representative degree of thickness of the non-spherical graphite pieces ~~based on the number and the areas~~ including measuring a maximum length and an area of each of the non-spherical graphite pieces having maximum lengths within a second range, included in the extracted non-spherical graphite pieces, determining an area of a non-graphite piece having a median value of the maximum lengths within the second range depending on the calculated maximum lengths and the areas, and dividing the determined area by the median value to obtain the thick and thin degree; and

outputting the calculated number and the thick and thin degree of the non-spherical graphite pieces in combination as an evaluation result.

2. (Currently Amended) The method for evaluating a graphite structure of a gray cast iron according to claim 1, ~~characterized in that~~ wherein the magnified image for the image analyzing step is taken from a microscopic screen image of the graphite structure by an image pickup device.

3. (Currently Amended) The method for evaluating a graphite structure of a gray cast iron according to claim 1, ~~characterized in that~~ wherein the non-spherical graphite pieces are extracted to calculate the number thereof based on a diameter of a circle having an area equal to that of each graphite piece or on a maximum length of each graphite piece.

4.   (Currently Amended) The method for evaluating a graphite structure of a gray cast iron according to claim 1, ~~characterized in that~~ <u>wherein</u> the smallest graphite piece of the non-spherical graphite pieces extracted to calculate the number thereof has a size of an area equal to that of a circle having a diameter of 5 μm or a maximum length of 10 μm.

5.   (Currently Amended) The method for evaluating a graphite structure of a gray cast iron according to claim 4, ~~characterized in that~~ <u>wherein</u> the smallest graphite piece of the non-spherical graphite pieces extracted to calculate the number thereof has a size of an area equal to that of a circle having a diameter of 5 μm.

6.   (Currently Amended) <u>A method for quantitatively evaluating a graphite structure of a gray cast iron by an image analysis apparatus, comprising the steps of</u>
        <u>analyzing a magnified image of the graphite structure, thereby extracting non-spherical graphite pieces of a particular size class contained in the graphite structure to calculate the number and areas of the non-spherical graphite pieces;</u>
        <u>calculating a thick and thin degree expressing a degree of thickness of the non-spherical graphite pieces based on the number and the areas; and</u>
        <u>outputting the number and the thick and thin degree of the non-spherical graphite pieces in combination as an evaluation result</u>
        ~~The method for evaluating a graphite structure of a gray cast iron according to claim 1, characterized in that~~ <u>wherein</u> the magnified image is preprocessed to except and eliminate graphite pieces in contact with a frame of the magnified image before extracting the non-spherical graphite pieces of the particular size class, and
        the number of the extracted non-spherical graphite pieces of a particular size class is corrected by the steps of
        counting the graphite pieces to be excepted and eliminated;
        classifying graphite pieces other than the graphite pieces to be excepted and eliminated into a plurality of size classes containing the particular size class, to count a number of the other graphite pieces of each size class; and

distributing the graphite pieces to be excepted and eliminated into the size classes proportionally based on a ratio between the numbers of the other graphite pieces, to add a number of the distributed graphite pieces to the numbers of the other graphite pieces.

7.   (Currently Amended) The method for evaluating a graphite structure of a gray cast iron according to claim 1, ~~characterized in that~~ wherein the total area of the extracted non-spherical graphite pieces is divided by the total number thereof to obtain the thick and thin degree.

8.   (Currently Amended) A method for quantitatively evaluating a graphite structure of a gray cast iron by an image analysis apparatus, comprising the steps of

analyzing a magnified image of the graphite structure, thereby extracting non-spherical graphite pieces of a particular size class contained in the graphite structure to calculate the number and areas of the non-spherical graphite pieces;

calculating a thick and thin degree expressing a degree of thickness of the non-spherical graphite pieces based on the number and the areas; and

outputting the number and the thick and thin degree of the non-spherical graphite pieces in combination as an evaluation result,

wherein the non-spherical graphite pieces are extracted to calculate the number thereof based on a diameter of a circle having an area equal to that of each graphite piece or on a maximum length of each graphite piece, ~~The method for evaluating a graphite structure of a gray cast iron according to claim 3, characterized in that~~ wherein graphite pieces having a maximum length of 50 µm or more and less than 150 µm are selected from the extracted non-spherical graphite pieces, maximum lengths and areas of the selected graphite pieces are measured, and an area of a graphite piece having a maximum length of 100 µm is calculated based on the measured data and divided by 100, to obtain the thick and thin degree of a representative graphite piece of the graphite structure.

9.   (Previously Presented) A computer-readable recording medium storing a program for carrying out the steps recited in claim 1.

10.   (**Currently Amended**) A system for quantitatively evaluating a graphite structure of a gray cast iron by image analysis, ~~characterized by~~ comprising an image analysis unit, an image input unit for inputting a magnified image of the graphite structure into the image analysis unit, and a display unit for indicating an analysis result,

wherein the image analysis unit comprises a graphite piece number/area calculating unit for analyzing the magnified image of the graphite structure, ~~thereby extracting~~ to extract non-spherical graphite pieces ~~of a particular size class~~ having sizes within in first range, contained in the graphite structure to calculate ~~the~~ a number ~~and areas~~ of the non-spherical graphite pieces, and a thick and thin degree calculating unit for calculating a thick and thin degree expressing a degree of <u>representative</u> thickness of the non-spherical graphite pieces ~~based on the number and the areas~~, <u>including a first section for measuring a maximum length and an area of each of the non-spherical graphite pieces having maximum lengths within a second range, included in the extracted non-spherical graphite pieces, a second section for determining an area of a non-graphite piece having a median value of the maximum lengths within the second range depending on the calculated maximum lengths and the areas, and a third section for dividing the determined area by the median value to obtain the thick and thin degree,</u> and

the number and the thick and thin degree of the non-spherical graphite pieces are visually indicated on the display unit in combination as an evaluation result.

11.   (**Currently Amended**) The system for evaluating a graphite structure of a gray cast iron according to claim 10, ~~characterized in that~~ <u>wherein</u> the smallest graphite piece of the non-spherical graphite pieces extracted to calculate the number thereof has a size of an area equal to that of a circle having a diameter of 5 μm.

12.   (**Currently Amended**) <u>A system for quantitatively evaluating a graphite structure of a gray cast iron by image analysis, comprising an image analysis unit, an image input unit for inputting a magnified image of the graphite structure into the image analysis unit, and a display unit for indicating an analysis result,</u>

<u>wherein the image analysis unit comprises a graphite piece number/area calculating unit for analyzing the magnified image of the graphite structure, thereby extracting non-</u>

spherical graphite pieces of a particular size class contained in the graphite structure to calculate the number and areas of the non-spherical graphite pieces, and a thick and thin degree calculating unit for calculating a thick and thin degree expressing a degree of thickness of the non-spherical graphite pieces based on the number and the areas, and the number and the thick and thin degree of the non-spherical graphite pieces are visually indicated on the display unit in combination as an evaluation result, ~~The system for evaluating a graphite structure of a gray cast iron according to claim 10, characterized in that~~ wherein the magnified image is preprocessed to except and eliminate graphite pieces in contact with a frame of the magnified image before extracting the non-spherical graphite pieces of the particular size class, and

the image analysis unit comprises a unit for correcting the number of the extracted non-spherical graphite pieces of the particular size class by the steps of

counting the graphite pieces to be excepted and eliminated;

classifying graphite pieces other than the graphite pieces to be excepted and eliminated into a plurality of size classes containing the particular size class, to count a number of the other graphite pieces of each size class; and

distributing the graphite pieces to be excepted and eliminated into the size classes proportionally based on a ratio between the numbers of the other graphite pieces, to add a number of the distributed graphite pieces to the numbers of the other graphite pieces.

13.   **(Currently Amended)** A system for quantitatively evaluating a graphite structure of a gray cast iron by image analysis, comprising an image analysis unit, an image input unit for inputting a magnified image of the graphite structure into the image analysis unit, and a display unit for indicating an analysis result

wherein the image analysis unit comprises a graphite piece number/area calculating unit for analyzing the magnified image of the graphite structure, thereby extracting non-spherical graphite pieces of a particular size class contained in the graphite structure to calculate the number and areas of the non-spherical graphite pieces, and a thick and thin degree calculating unit for calculating a thick and thin degree expressing a degree of thickness of the non-spherical graphite pieces based on the number and the areas, and the number and

the thick and thin degree of the non-spherical graphite pieces are visually indicated on the display unit in combination as an evaluation result,

wherein the smallest graphite piece of the non-spherical graphite pieces extracted to calculate the number thereof has a size of an area equal to that of a circle having a diameter of 5 μm, and ~~The system for evaluating a graphite structure of a gray cast iron according to claim 11, characterized in that~~

wherein graphite pieces having a maximum length of 50 μm or more and less than 150 μm are selected from the extracted non-spherical graphite pieces, maximum lengths and areas of the selected graphite pieces are measured, and an area of a graphite piece having a maximum length of 100 μm is calculated based on the measured data and divided by 100, to obtain the thick and thin degree of a representative graphite piece of the graphite structure.

14.   (New) A method for quantitatively evaluating a graphite structure of a gray cast iron by an image analysis apparatus, comprising the steps of analyzing a magnified image of the graphite structure to extract non-spherical graphite pieces contained in the graphite structure to calculate a number of the extracted non-spherical graphite pieces, the extracted non-spherical graphite pieces having at least one of areas each of which is equal to a circle having a diameter of 5 μm or more and maximum lengths of 10 μm or more;

calculating a thick and thin degree expressing a representative degree of thickness of the non-spherical graphite pieces, including measuring a maximum length and an area of each of the non-spherical graphite pieces having maximum lengths ranging from 50 μm or more to less than 150 μm, included in the extracted non-spherical graphite pieces, determining an area of a non-graphite piece having the maximum length of 100 μm depending on the calculated maximum lengths and the areas, the maximum length of 100 μm being a median value of the maximum lengths, and dividing the determined area by 100 to obtain the thick and thin degree; and

outputting the calculated number and thick and thin degree of the non-spherical graphite pieces in combination as an evaluation result.